

US EPA ARCHIVE DOCUMENT

**POTASSIUM DICHROMATE LISTING  
BACKGROUND DOCUMENT FOR  
THE INORGANIC CHEMICAL  
LISTING DETERMINATION**

**This Document Contains No Confidential Business Information**

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## 1. SECTOR OVERVIEW

### 1.1 SECTOR DEFINITION, FACILITY NAME AND LOCATION

Potassium Dichromate is currently produced in the United States by one manufacturer, Sentury Reagents in Rock Hill, SC.

### 1.2 PRODUCTS, PRODUCT USAGE AND MARKETS

The chemical formula for potassium dichromate, also known as dichromic acid, dipotassium salt, potassium bichromate, bichromate of potash, chromic acid, dipotassium salt, dipotassium dichromate, and iopezite is  $K_2Cr_2O_7$ . It is generally an orange-red color powder and has a molecular weight of 294 gram (g)/mol. Potassium dichromate has a melting point of 398 degrees Celsius ( C) and a boiling point of 500 C, at which point it decomposes.<sup>1</sup> Potassium dichromate is soluble in water and somewhat soluble in ethyl alcohol.<sup>2</sup>

Potassium dichromate has a wide variety of uses in leather tanning, dyeing, painting, porcelain decorating, printing, photolithography, pigment-prints, staining wood, pyrotechnics, safety matches; for blending palm oil, wax, & sponges; for waterproofing fabrics; as an oxidizer in the manufacture of organic compounds; in electric batteries, and as a corrosion inhibitor.

### 1.3 PRODUCTION CAPACITY

The production capacity of Sentury Reagents is CBI. No CBI capacity data is available.

### 1.4 PRODUCTION, PRODUCT AND PROCESS TRENDS

No information regarding production or process trends for potassium dichromate was found. Potassium dichromate was once the major parent chromium chemical of commerce. In 1880, Germany introduced sodium carbonate as a substitute for potassium carbonate in manufacturing. Since then sodium dichromate gradually replaced potassium dichromate. A market does still exist for the compound, but imports supply what need is not met by the single U.S. producer.

## 2.0 DESCRIPTION OF MANUFACTURING PROCESS

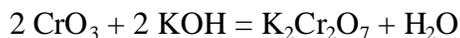
### 2.1 PRODUCTION PROCESS DESCRIPTION

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<sup>1</sup> [http:// ntp-db.niehs.nih.gov / NTP\\_Reports / NTP\\_Chem\\_H&S / iH\\_Chem \\_H&S\\_ Frames.html](http://ntp-db.niehs.nih.gov/NTP_Reports/NTP_Chem_H&S/iH_Chem_H&S_Frames.html)

<sup>2</sup> Ibid.

Sentury Reagents' potassium dichromate production process starts with the reaction of potassium hydroxide and chromium trioxide in a reactor creating a mother liquor. The reaction is as follows:



The mother liquor is filtered and the resultant filter solids are sent off-site for disposal to a Subtitle C facility. The mother liquor is then sent to a crystallizer to precipitate crystalline potassium dichromate, which is recovered by centrifuging. The mother liquor from the product centrifuge is returned to the reactor.

## 2.2 PRODUCTION TRENDS, CHANGES AND IMPROVEMENTS

With only one generator in the U.S., imports providing current needs, and the greater reliance on sodium dichromate within the industry, it is unlikely that there will be any new generators of potassium dichromate.

## 3.0 WASTE GENERATION AND MANAGEMENT

Section 3.1 presents a detailed discussion of the production steps that generate the wastestream, the management steps for the wastestream, and the characterization of the physical and chemical properties of the wastestream. One wastestream identified by Sentury Reagents, mother liquor, is immediately recycled back through the process. Because there is no potential for exposure, it was not evaluated any further for the purposes of this listing determination. **Appendix A** presents a complete summary of the wastestreams generated at this potassium dichromate facility, volume of the wastestreams generated in metric tons per year (MT/yr), and the associated final management step.

### 3.1 SUMMARY OF WASTE GENERATION PROCESSES

One wastestream is generated from the production of potassium dichromate: filter solids and spent filter media.

#### Waste Generation

Potassium dichromate is made by the reaction of potassium hydroxide and chromium trioxide liquor in solution. The solution is filtered producing filter solids and spent filter media.

#### Waste Management

These filters and filter solids are characteristically hazardous wastes that are stored on-site in drums and sent off-site to a Subtitle C facility for treatment: chromium reduction followed by stabilization, to meet land disposal restriction requirements and disposal. In 1998, 0.6 MT were generated.

## Waste Characterization

This waste is a characteristically hazardous waste assigned waste code D007 (chromium). According to data provided by Sentury Reagents, this waste has a total chromium concentration of 12.5% by weight or approximately 124,900 mg/kg or mg/L. Using a 20 to 1 dilution ratio, the maximum TCLP concentration for chromium is 6,246 mg/L which is well above the 5.0 mg/L TC level for chromium. Based on this chromium concentration, it is expected that this waste will always be characteristically hazardous for chromium.

**APPENDIX A**

**Summary of Waste Generation and Management**

<b>Wastestream</b>	<b>Facility</b>	<b>Volume (MT/yr)</b>	<b>Management</b>
Filter solids and spent filter media	Sentury Reagents	0.6	Offsite treatment and disposal in Subtitle C landfill
Mother liquor	Sentury Reagents	7	Recycled back through process